4. Herd improvement

A. Use of herd testing

Farmers had the choice of two herd testing options in 1999/00. They were able to choose between Self Sample Service (where the farmer does the sampling using equipment supplied by Livestock Improvement), and Self Sample Assist (where the farmer does the sampling using equipment supplied by Livestock Improvement and Livestock Improvement provides an assist officer).

All herd test systems are based on measured yields obtained over a 24-hour period, with samples collected from consecutive evening and morning milkings.

Farmers were able to choose the frequency of testing. If farmers tested four or more times a season, they received information on individual cow's milk, milkfat and protein yields, milkfat and protein percentages, and somatic cell count information. Also included is the Production Worth, which takes account of each lactation of the cow as well as the date of calving, age, stage of lactation and Breeding Worth. With higher frequencies of herd testing, the estimates of absolute lactation yields are more reliable. (See section 4D for Animal Evaluation statistics).

Farmers who opted for two or three tests during the season received Production Worth for individual cows but did not receive estimated lactation yields for milk, milkfat, or protein. Production Worth information is sufficient for farmers to cull for low production.

- ***83% of herds undertake herd testing in 1999/00***

The regional uptake of herd testing services in 1999/00 is shown in Table 4.1, where the number of cows tested refers to all cows tested at least once in the season. Bay of Plenty/East Coast region has the highest percentage of herds using herd testing with 87.9%. Auckland region at 94.1% reported the highest number of cows herd testing.

Table 4.1: **Use of herd testing by region in 1999/00**

All systems (Sample Officer, Self Sample and Self Sample Assist)

Livestock Improvement Region	*Herds tested*	*Total herds*	*% of total herds*	*Cows tested*	*Total cows*	*% of total cows*
Northland	1,283	1,736	73.9	274,713	337,298	81.4
Auckland	4,727	5,483	86.2	1,110,528	1,180,367	94.1
Bay of Plenty/East Coast	695	791	87.9	168,841	184,395	91.6
Taranaki	2,006	2,396	83.7	409,910	482,350	85.0
Wellington/Hawkes Bay	1,115	1,369	81.4	289,338	361,429	80.1
South Island	1,695	2,086	81.3	552,871	723,523	76.4
New Zealand	11,521	13,861	83.1	2,806,201	3,269,362	85.8

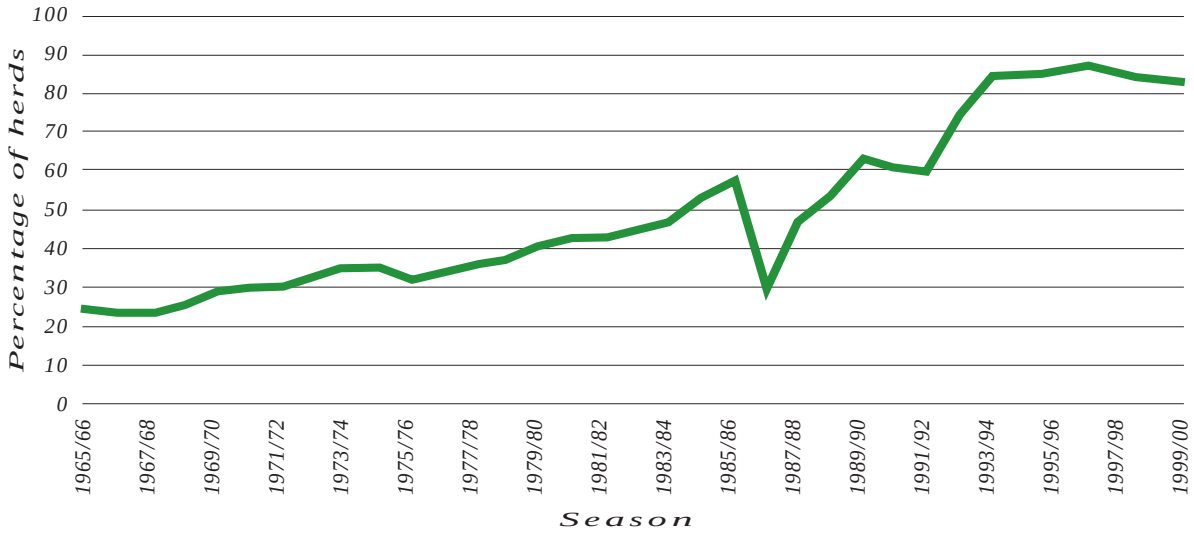
The percentage of total herds using herd testing decreased slightly to 83.1% in 1999/00 (Table 4.2). This figure is down 4.1% from the highest percentage of herd testing set in 1996/97. However, the percentage of total cows tested (85.8%) remained the same as the previous season.

Table 4.2: Trend in the use of herd testing services since 1955/56

Season	Number of herds	% of total herds	Number of cows (000)	% of total cows
1955/56	7,469	21.0	476	23.8
1960/61	7,006	22.5	494	25.6
1965/66	6,206	23.5	521	25.0
1966/67	5,730	22.7	501	23.5
1967/68	5,724	23.1	538	24.1
1968/69	6,089	24.7	601	26.1
1969/70	6,768	28.4	700	30.2
1970/71	6,574	29.3	716	32.0
1971/72	6,274	29.6	690	31.4
1972/73	6,771	32.6	772	35.3
1973/74	6,640	34.7	780	36.4
1974/75	6,436	34.7	779	37.5
1975/76	5,858	31.8	706	33.7
1976/77	5,945	33.2	725	34.9
1977/78	6,159	35.5	771	37.6
1978/79	6,250	37.0	801	39.3
1979/80	6,662	40.4	871	42.6
1980/81	6,789	42.2	909	44.8
1981/82	6,702	42.4	922	44.7
1982/83	7,018	44.4	995	46.8
1983/84	7,430	46.6	1,092	49.4
1984/85	8,445	53.2	1,294	56.7
1985/86	9,026	57.3	1,484	63.9
1986/87	4,555	29.7	753	33.0
1987/88	6,930	46.8	1,175	52.5
1988/89	7,932	53.8	1,341	59.1
1989/90	9,213	63.1	1,604	69.3
1990/91	8,918	60.7	1,566	65.2
1991/92	8,661	59.9	1,611	66.1
1992/93	10,843	75.0	2,039	78.3
1993/94	12,372	84.8	2,377	86.9
1994/95	12,446	85.0	2,474	87.4
1995/96	12,620	85.6	2,592	88.3
1996/97	12,851	87.2	2,746	89.6
1997/98	12,510	85.3	2,826	87.7
1998/99	12,059	84.0	2,819	85.7
1999/00	11,521	83.1	2,806	85.8

The trend in the percentage of total herds using herd testing continues to decrease slightly from the peak reached in the 1996/97 season (Graph 4.1).

Graph 4.1: Trend in the percentage of herds testing since 1965/66



B. Herd test averages

The lactation yield figures in this section are for cows herd tested. Season and breed averages (parts i and iii) are calculated on lactation yields for herds that tested four or more times during the season. Monthly averages (part ii) are calculated on lactation yields for herds that tested at least once during the season, and only cows that lactated for one hundred days or more were included in herd test averages. In comparison, the average milkfat figures given in Chapters 2 and 3 (national and regional dairy statistics respectively) are based on all herds supplying a dairy company, regardless of whether herd testing was used, and represent the average production per cow as supplied to the dairy company. Therefore, production figures reported using each of these methods would likely differ.

Days in milk (herd testing) information is the number of days from the start of lactation to the calculated end of lactation. The start of lactation is four days from calving (with a maximum of 60 days between the estimated start of lactation and the first herd test). The end of lactation is the last herd test date plus 15 days. The inclusion of herds with less than four tests reduces the average lactation length. Therefore, the reported number of days in milk for herd testing purposes does not necessarily reflect the average lactation length of dairy cows.

Additional information is included for the number of days in milk reported since 1997/98. The days in milk (production) figure is the number of days from the estimated start of lactation to the estimated end of lactation. The results are derived from seasonal supplier tanker pick-up information adjusted for calving spread. The new methodology provides a more accurate measure of the average lactation length of dairy cows.

i) Season averages

- ***South Island has highest herd test production***

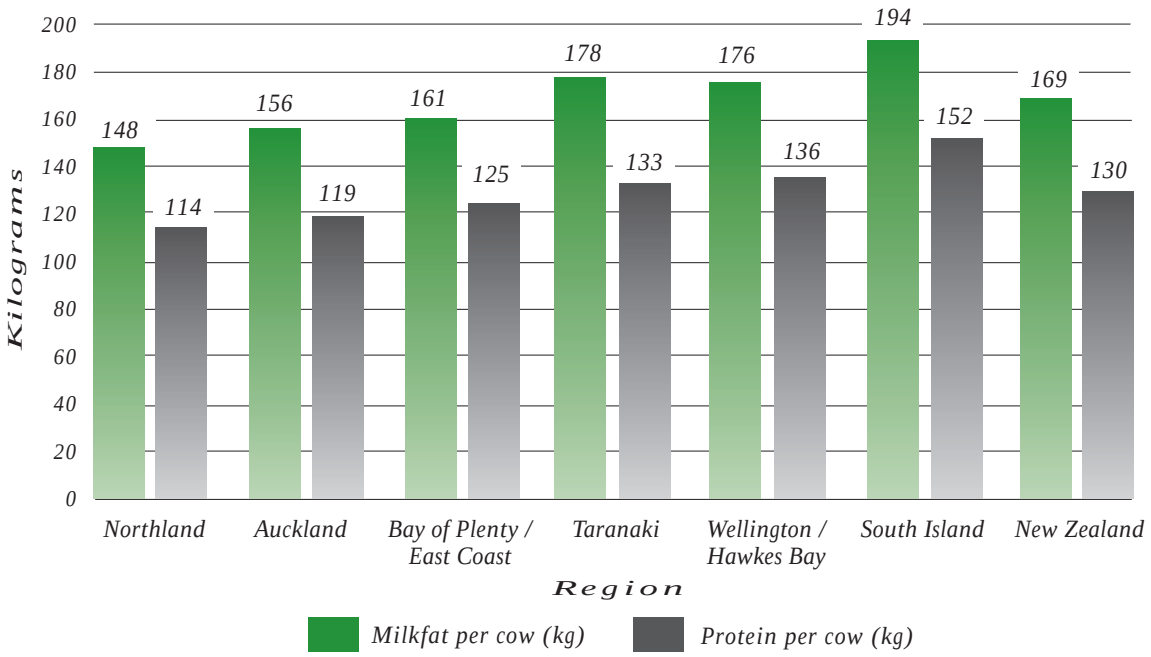
Average per cow statistics for each Livestock Improvement region is summarised in Table 4.3. The additional information for the days in milk (production) more accurately reflects the lactation length by using milk supply information from seasonal suppliers. The South Island recorded the highest per cow per day milk volume (4,246 litres), milkfat (194 kg) and protein (152 kg) of cows herd tested.

Table 4.3: 1999/00 Season herd test averages per cow by region

Livestock Improvement Region	*Milk (litres)*	*Milkfat (kg)*	*Milkfat (%)*	*Protein (kg)*	*Protein (%)*	*Somatic cell count (000 cells/millilitre)*	*Days in milk (herd testing)*	*Days in milk (production)*
Northland	3,232	148	4.56	114	3.49	208	219	276
Auckland	3,345	156	4.64	119	3.54	180	214	252
Bay of Plenty / East Coast	3,580	161	4.50	125	3.48	211	218	262
Taranaki	3,499	178	5.14	133	3.81	204	226	263
Wellington / Hawkes Bay	3,810	176	4.64	136	3.57	197	226	281
South Island	4,246	194	4.60	152	3.58	207	230	273
New Zealand	3,601	169	4.69	130	3.58	193	221	263

The 1999/00 milkfat and protein lactation regional averages of herd tested cows (Graph 4.2) shows a wide range in values between all regions, with milkfat production ranging from 148 (Northland) to 194 kg per cow (South Island) and protein production from 114 (Northland) to 152 kg per cow (South Island). Although the South Island region had the highest overall production, it also had the lowest proportion of cows herd tested.

Graph 4.2: Average milkfat and protein production per cow in 1999/00



• Increase in production per cow for 1999/00

The last twenty years has seen a general trend of increasing production in both milk volume and milkfat. However, in individual years this trend can be masked by other factors, in particular, weather conditions. The 1998/99 season shows a decrease in production per cow, the lowest in more than 10 years (Table 4.4).

Additional information for the days in milk figure has been included for the last three seasons. The days in milk (production) figure more accurately reflects the lactation length by using seasonal milk supply information. The decrease in the average somatic cell count per millilitre of milk from 1992/93 to 1997/98, as shown in Table 4.4, is due to a number of factors, including industry pressure for improved milk quality, farm management practice, and climatic conditions. The 2.6% increase in somatic cell count (000 cells per millilitre) recorded in 1998/99 can be attributed to unfavourably dry climatic conditions during the latter half of the season.

Table 4.4: Trend in the national herd test averages since 1970/71

Season	Milk (litres)	Milkfat (kg)	Milkfat (%)	Protein (kg)	Protein (%)	Days in milk (herd test)	Days in milk (production)	Somatic cell count (000 cells/ millilitre)
1970/71	2,809	134	4.77	–	–	–	–	–
1971/72	3,089	146	4.73	–	–	–	–	–
1972/73	2,941	139	4.73	–	–	–	–	–
1973/74	2,797	135	4.83	–	–	–	–	–
1974/75	2,913	138	4.74	–	–	–	–	–
1975/76	3,112	149	4.79	–	–	–	–	–
1976/77	3,240	154	4.75	–	–	–	–	–
1977/78	3,027	142	4.69	–	–	–	–	–
1978/79	3,266	155	4.75	–	–	–	–	–
1979/80	3,380	162	4.79	–	–	–	–	–
1980/81	3,331	160	4.80	–	–	–	–	–
1981/82	3,326	159	4.78	–	–	–	–	–
1982/83	3,377	160	4.74	–	–	–	–	–
1983/84	3,451	165	4.78	–	–	–	–	–
1984/85	3,416	162	4.74	–	–	–	–	–
1985/86	3,424	161	4.78	–	–	247	–	–
1986/87	3,046	143	4.79	–	–	230	–	–
1987/88	3,300	156	4.81	–	–	235	–	–
1988/89	3,197	149	4.67	115	3.60	237	–	265
1989/90	3,221	152	4.72	117	3.66	235	–	358
1990/91	3,190	152	4.81	116	3.65	222	–	298
1991/92	3,361	162	4.83	124	3.70	226	–	282
1992/93	3,298	157	4.77	121	3.65	221	–	280
1993/94	3,560	171	4.84	131	3.69	223	–	216
1994/95	3,253	154	4.77	118	3.64	208	–	206
1995/96	3,501	164	4.72	126	3.60	224	–	206
1996/97	3,641	173	4.78	133	3.66	223	–	197
1997/98	3,373	158	4.67	119	3.52	209	266	195
1998/99	3,189	147	4.51	113	3.44	208	266	200
1999/00	3,601	169	4.69	130	3.58	221	263	193

– not available

ii) Monthly averages

- ***Lowest Somatic Cell Count per cow per day recorded in Auckland***

Before September 1998, monthly herd test averages included all herds scheduled for four or more tests during the season. After this time all cows herd tested in each month were included, provided they were tested once or more during the season (Table 4.5).

The seasonal average figures presented in Table 4.5 are calculated using national monthly averages, and are therefore affected by milk volume. Statistics for May, June and July are based on far fewer cows than the statistics for other months, as only a few herds (generally town milk herds) test in these months. Differences in climate between regions, which in turn can affect the mating period, available feed and cow condition, are illustrated by differing months of peak production.

Table 4.5: 1999/00 Monthly herd test averages by region

Average litres of milk per cow per day

Livestock Improvement Region	1999 Jun	Jul	Aug	Sep	Oct	Nov	Dec	2000 Jan	Feb	Mar	Apr	May	Season average
Northland	14.55	14.12	15.95	18.44	17.75	15.56	14.24	13.35	10.89	9.15	7.89	13.06	14.10
Auckland	16.56	16.69	18.48	20.50	20.33	16.73	15.88	14.45	12.29	8.46	6.99	11.33	15.08
B.O.P. / East Coast	16.12	14.77	19.32	21.01	20.77	17.74	16.39	15.15	12.46	10.24	9.47	11.03	15.81
Taranaki	15.97	17.47	17.78	19.53	19.91	16.63	15.45	15.19	13.71	10.09	8.46	10.27	14.94
Well. / Hawkes Bay	14.89	15.92	17.69	21.16	21.12	18.32	16.93	16.30	14.97	11.60	10.38	11.69	16.23
South Island	16.69	17.94	17.88	22.84	23.50	20.63	18.91	17.90	16.31	14.13	12.50	11.61	17.78
New Zealand	15.64	16.29	17.85	20.46	20.86	17.48	16.51	15.25	13.57	10.15	9.68	11.60	15.67

Average kg of milkfat per cow per day

Livestock Improvement Region	1999 Jun	Jul	Aug	Sep	Oct	Nov	Dec	2000 Jan	Feb	Mar	Apr	May	Season average
Northland	0.63	0.64	0.73	0.82	0.78	0.70	0.65	0.63	0.53	0.47	0.41	0.60	0.65
Auckland	0.67	0.69	0.83	0.91	0.90	0.76	0.74	0.69	0.60	0.45	0.39	0.54	0.70
B.O.P. / East Coast	0.67	0.65	0.85	0.91	0.90	0.77	0.74	0.69	0.59	0.51	0.49	0.53	0.71
Taranaki	0.77	0.80	0.86	0.93	0.95	0.83	0.78	0.80	0.74	0.58	0.51	0.56	0.77
Well. / Hawkes Bay	0.63	0.68	0.78	0.93	0.93	0.82	0.78	0.77	0.73	0.60	0.55	0.59	0.76
South Island	0.74	0.79	0.78	0.99	1.03	0.91	0.85	0.82	0.77	0.71	0.65	0.60	0.82
New Zealand	0.67	0.71	0.80	0.91	0.93	0.80	0.77	0.73	0.67	0.53	0.52	0.59	0.74

Average kg of protein per cow per day

Livestock Improvement Region	1999 Jun	Jul	Aug	Sep	Oct	Nov	Dec	2000 Jan	Feb	Mar	Apr	May	Season average
Northland	0.50	0.50	0.57	0.66	0.63	0.53	0.50	0.47	0.39	0.34	0.30	0.47	0.50
Auckland	0.55	0.56	0.68	0.75	0.73	0.58	0.56	0.51	0.43	0.32	0.28	0.42	0.54
B.O.P. / East Coast	0.55	0.51	0.70	0.75	0.73	0.60	0.56	0.52	0.43	0.37	0.36	0.42	0.55
Taranaki	0.60	0.61	0.67	0.74	0.75	0.61	0.57	0.58	0.53	0.41	0.35	0.42	0.57
Well. / Hawkes Bay	0.51	0.54	0.63	0.77	0.75	0.63	0.59	0.58	0.54	0.44	0.40	0.45	0.58
South Island	0.58	0.60	0.60	0.83	0.83	0.71	0.66	0.64	0.59	0.54	0.49	0.46	0.64
New Zealand	0.54	0.55	0.65	0.75	0.75	0.61	0.58	0.55	0.49	0.38	0.38	0.45	0.57

Average somatic cell count (000 cells per millilitre)

Livestock Improvement Region	1999 Jun	Jul	Aug	Sep	Oct	Nov	Dec	2000 Jan	Feb	Mar	Apr	May	Season average
Northland	205	211	177	177	175	170	192	202	229	259	344	269	208
Auckland	199	170	162	156	146	142	160	170	194	246	328	244	180
B.O.P. / East Coast	258	210	215	189	163	172	188	193	219	245	273	293	211
Taranaki	385	249	169	167	160	159	162	174	181	204	237	247	204
Well. / Hawkes Bay	221	183	217	179	175	169	181	183	203	216	239	249	197
South Island	231	234	240	202	176	180	187	200	200	213	215	236	207
New Zealand	218	209	181	169	160	158	172	181	198	233	266	246	193

iii) Breed averages

Holstein-Friesian/Jersey cross-bred cows show higher milkfat production

The 1999/00 herd test statistics were analysed for Holstein-Friesian, Jersey, Ayrshire and Holstein-Friesian/ Jersey cross-breds. The breed averages listed in Table 4.6 are for cows herd tested four or more times during the season.

On average, Holstein-Friesian/Jersey cross-bred cows produced more milkfat than the other breeds listed, while Holstein-Friesian cows produced more protein and a higher volume of milk. Six-year-old cows produced more milkfat, protein and milk than any other age group for Holstein-Friesian, Jersey and Holstein-Friesian/Jersey cross-bred cows. In the Ayrshire breed, six-year-old cows had the highest average milkfat production and eight-year-old cows had the highest average milk and protein production.

Table 4.6: 1999/00 Herd test breed averages by age of cow

Holstein-Friesian

Age	*Number*	*Days in milk*	*Milk (litres)*	*Milkfat (kg)*	*Protein (kg)*	*Milkfat %*	*Protein %*
2	241,172	219	3,131	136.7	107.8	4.39	3.45
3	223,829	214	3,632	157.4	125.1	4.37	3.45
4	204,584	215	3,945	173.9	137.4	4.44	3.49
5	179,903	215	4,111	179.4	141.9	4.40	3.46
6	141,323	215	4,214	182.1	144.6	4.35	3.44
7	110,226	214	4,161	180.8	144.0	4.38	3.48
8	83,957	213	4,059	177.1	140.6	4.39	3.48
9	56,296	210	3,924	171.6	135.6	4.40	3.47
10+	72,466	206	3,659	160.3	125.5	4.40	3.44
Total	1,313,756	215	3,803	165.8	131.3	4.39	3.46

Jersey

Age	*Number*	*Days in milk*	*Milk (litres)*	*Milkfat (kg)*	*Protein (kg)*	*Milkfat %*	*Protein %*
2	77,553	224	2,361	134.5	93.7	5.72	3.98
3	66,820	220	2,661	152.0	108.0	5.73	4.06
4	58,592	220	2,908	168.7	119.0	5.83	4.10
5	53,799	221	3,039	174.2	123.6	5.75	4.08
6	44,285	220	3,042	175.7	123.5	5.79	4.07
7	32,879	219	3,032	173.8	122.8	5.76	4.06
8	26,118	216	2,929	170.7	119.5	5.85	4.09
9	18,755	232	2,838	166.5	116.5	5.88	4.11
10+	24,327	210	2,719	155.1	109.7	5.72	4.05
Total	403,128	220	2,791	160.5	113.1	5.77	4.06

Holstein-Friesian/Jersey cross-bred (1st-2nd cross)

Age	*Number*	*Days in milk*	*Milk (litres)*	*Milkfat (kg)*	*Protein (kg)*	*Milkfat %*	*Protein %*
2	130,899	221	2,862	143.2	105.9	5.04	3.71
3	90,903	216	3,306	162.7	122.6	4.96	3.72
4	76,848	217	3,621	180.2	135.4	5.02	3.75
5	70,979	217	3,775	185.2	139.9	4.94	3.72
6	54,590	217	3,867	187.6	141.8	4.90	3.69
7	41,684	216	3,829	185.4	141.2	4.89	3.71
8	34,520	214	3,733	182.5	138.2	4.93	3.72
9	24,213	212	3,621	177.7	134.0	4.95	3.72
10+	31,343	207	3,402	164.4	123.7	4.86	3.65
Total	555,979	217	3,445	169.5	127.4	4.96	3.71

Ayrshire

Age	Number	Days in milk	Milk (litres)	Milkfat (kg)	Protein (kg)	Milkfat %	Protein %
2	5,183	222	2,839	125.9	100.1	4.45	3.53
3	4,772	218	3,220	142.2	114.8	4.43	3.57
4	4,215	218	3,599	157.8	128.2	4.40	3.56
5	3,813	218	3,729	161.2	132.1	4.35	3.55
6	3,241	217	3,756	162.8	132.9	4.35	3.54
7	2,548	216	3,744	161.7	132.3	4.33	3.54
8	1,943	216	3,770	162.4	133.2	4.32	3.54
9	1,344	214	3,649	158.3	129.0	4.36	3.54
10+	1,833	212	3,445	150.1	121.8	4.36	3.54
Total	28,892	218	3,452	150.7	122.3	4.39	3.55

Refinements made to the method used to compute the number of Holstein-Friesian/Jersey cross-breds have resulted in a more accurate reflection of total numbers. A cross-bred is defined as having at most 13/16 of any one breed. For example, a Holstein-Friesian/Jersey cross-bred may be 13/16 Holstein-Friesian, 2/16 Jersey and 1/16 Ayrshire.

Holstein-Friesians have the highest average liveweight across all ages for the breeds shown in Table 4.7. In contrast, Jerseys have the lowest average liveweight for all ages. Holstein-Friesian/Jersey cross-breds and Ayshires have similar average liveweights.

Table 4.7: Liveweight by age and breed of cow for 1999/00

	Holstein-Friesian		Jersey		Holstein-Friesian/Jersey cross-bred		Ayrshire	
Age	Average liveweight (kg)	Number of cows	Average liveweight (kg)	Number of cows	Average liveweight (kg)	Number of cows	Average liveweight (kg)	Number of cows
2	406	16,907	318	6,168	376	10,018	368	273
3	457	4,025	363	1,280	425	2,779	433	102
4	489	3,266	391	1,025	457	2,129	444	50
5	504	2,583	396	1,105	466	1,793	462	42
6	518	1,868	410	839	479	1,364	472	45
7	525	1,561	406	616	487	1,007	483	24
8	525	1,127	410	437	485	708	484	37
9	516	714	406	282	484	464	506	9
10+	516	989	412	406	480	293	485	21
Total	450	33,040	355	12,158	420	20,855	417	603

C. Artificial Breeding (AB) statistics

- ***3.4% increase in total cows to AB for 1999/00***

All artificial inseminations are recorded on the Livestock Improvement National Database. Table 4.8 provides a summary of cows mated to artificial breeding (AB) for the last nine seasons. The number of cows inseminated has increased every year, with the exception of 1998/99 which shows a minimal decrease of 0.1%. The percentage of cows to AB seems to have plateaued at around 80-85% for the last seven seasons (Graph 4.3). A small increase in the number of yearlings to AB in 1999/00 contrasts with the general decline since 1995/96 (Table 4.8).

Table 4.8: Trends in Artificial Breeding (AB) use since 1991/92 by region: cows and yearlings to AB

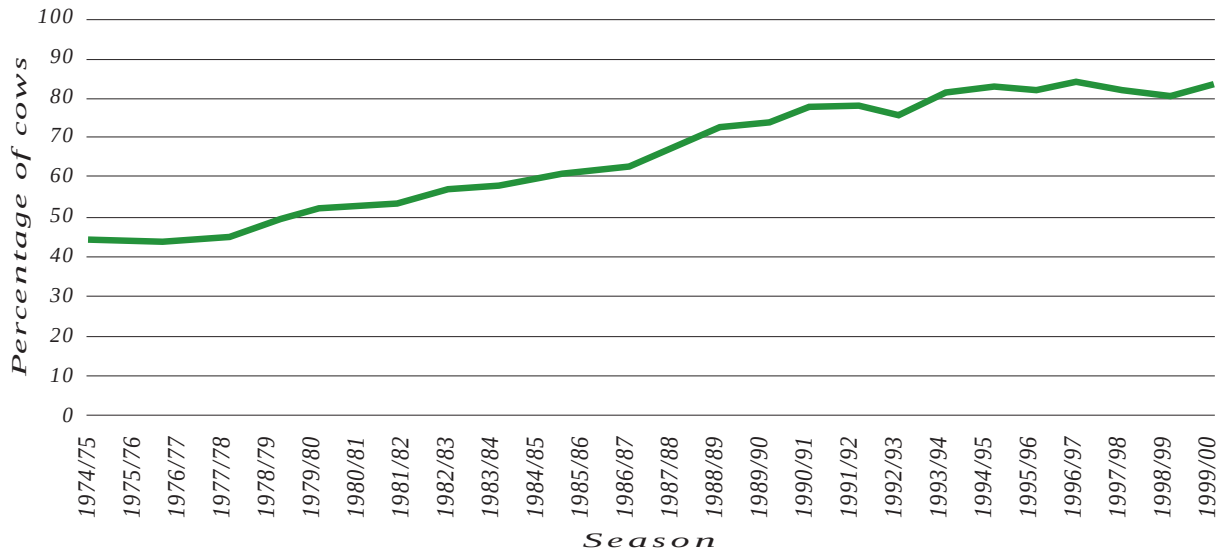
Cows to AB

Livestock Improvement Region	*1991/92*	*1992/93*	*1993/94*	*1994/95*	*1995/96*	*1996/97*	*1997/98*	*1998/99*	*1999/00*
Northland	224,597	216,772	249,293	253,662	257,557	262,429	258,057	244,115	246,617
Auckland	841,397	886,199	960,928	992,301	1,007,497	1,065,624	1,069,038	1,066,442	1,057,618
B.O.P./ East Coast	131,478	134,648	147,388	151,469	152,836	155,267	156,602	153,294	152,751
Taranaki	350,946	361,864	388,152	398,201	398,571	399,435	404,930	395,636	405,605
Well. / Hawkes Bay	164,950	174,192	204,054	220,471	230,582	254,002	266,514	266,171	276,517
South Island	181,003	206,475	266,201	319,949	371,210	437,078	483,968	510,514	587,957
New Zealand	1,894,371	1,980,150	2,216,016	2,336,053	2,418,253	2,573,835	2,639,109	2,636,172	2,727,065

Yearlings to AB

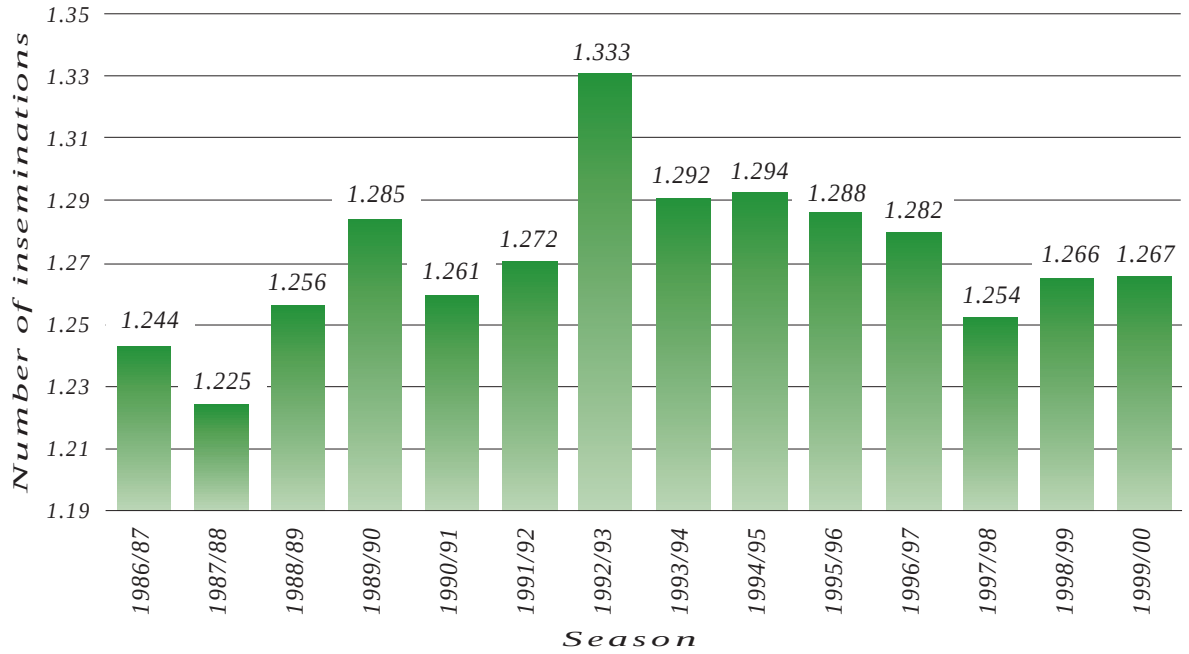
Livestock Improvement Region	*1991/92*	*1992/93*	*1993/94*	*1994/95*	*1995/96*	*1996/97*	*1997/98*	*1998/99*	*1999/00*
Northland	13,071	14,475	19,555	21,159	22,034	20,613	15,966	11,188	9,825
Auckland	24,921	32,608	42,856	54,867	53,038	48,291	31,102	25,968	21,804
B.O.P./ East Coast	6,996	8,582	13,286	16,773	17,501	15,753	10,317	7,854	7,250
Taranaki	9,884	11,989	15,740	19,099	17,864	11,909	8,428	5,748	5,700
Well. / Hawkes Bay	5,118	5,534	10,882	13,473	15,321	14,375	9,887	6,223	6,313
South Island	10,033	16,011	32,382	44,715	48,194	54,152	35,159	34,906	41,469
New Zealand	70,023	89,199	134,701	170,086	173,952	165,093	110,859	91,887	92,361

Graph 4.3: Trend in the percentage of cows to Artificial Breeding (AB) since 1974/75



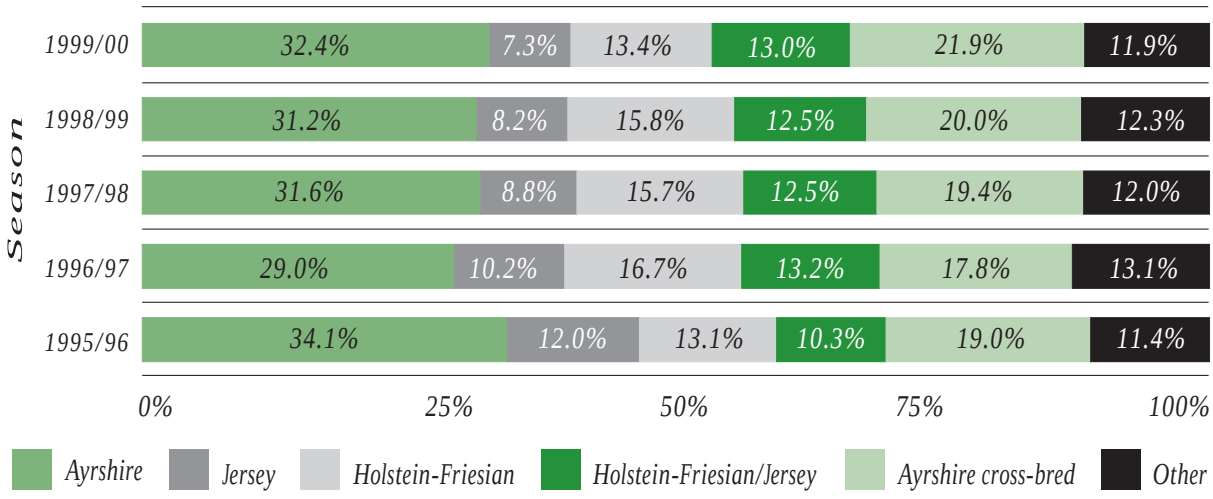
Since the 1986/87 season, the average number of inseminations per cow as recorded on the Livestock Improvement National Database has ranged between 1.23 (1987/88) and 1.33 (1992/93) inseminations (Graph 4.4). In 1999/00 the average number of inseminations per cow remained the same as the previous season at 1.27.

Graph 4.4: Average number of inseminations per cow since 1986/87

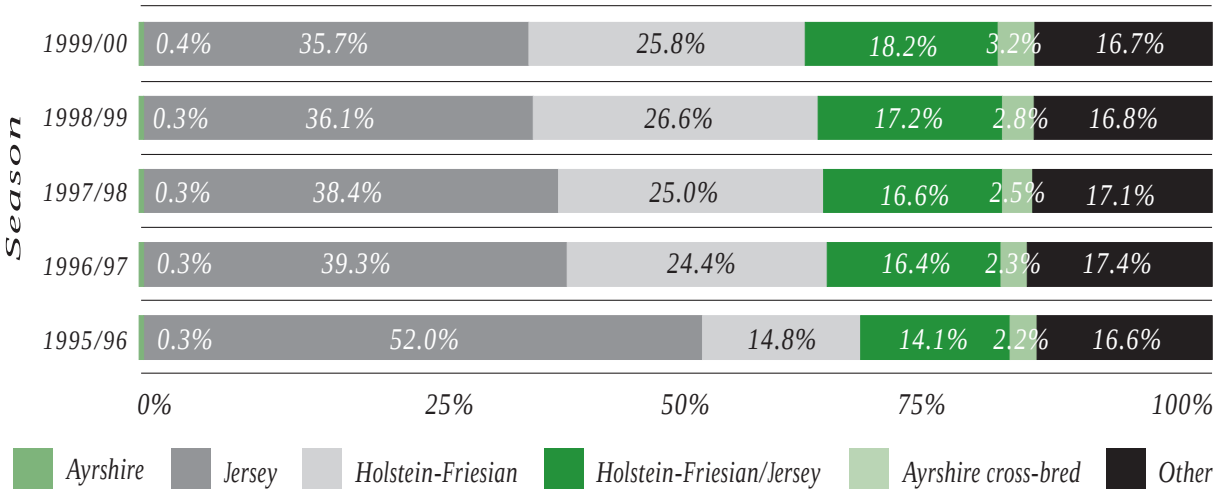


The use of Ayrshire, Holstein-Friesian and Jersey semen over different cow breeds for the five seasons from 1995/96 to 1999/00 is shown below. Ayrshire semen use over Jersey and Holstein-Friesian cows shows slight decreases compared to the previous season (Graph 4.5). The use of Jersey semen over other breeds remains similar to the previous season (Graph 4.6). The use of Holstein-Friesian semen over Holstein-Friesian cows has decreased, but increased slightly over all other breeds (Graph 4.7).

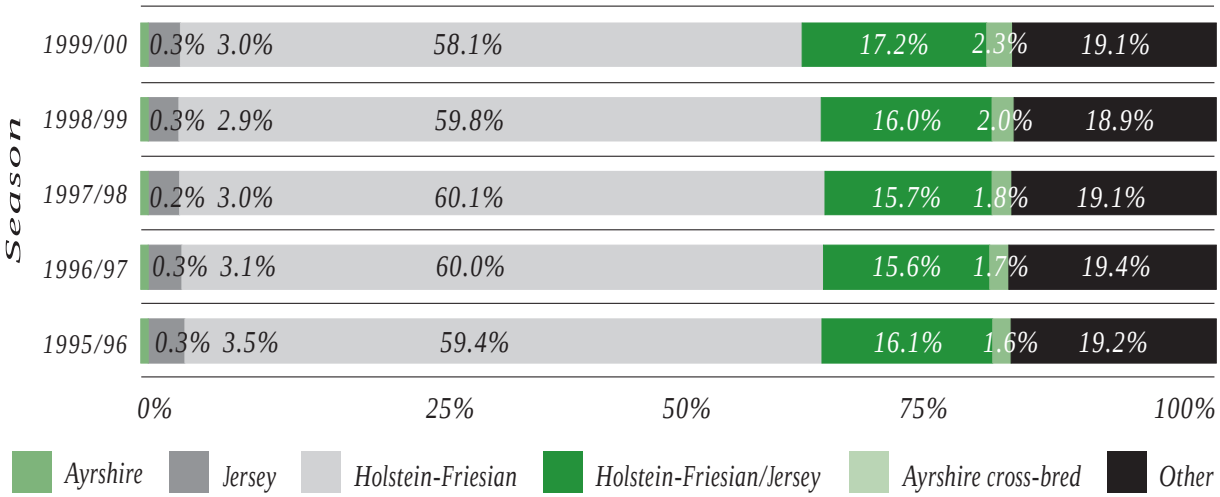
Graph 4.5: Ayrshire semen usage by cow breed since 1995/96



Graph 4.6: Jersey semen usage by cow breed since 1995/96

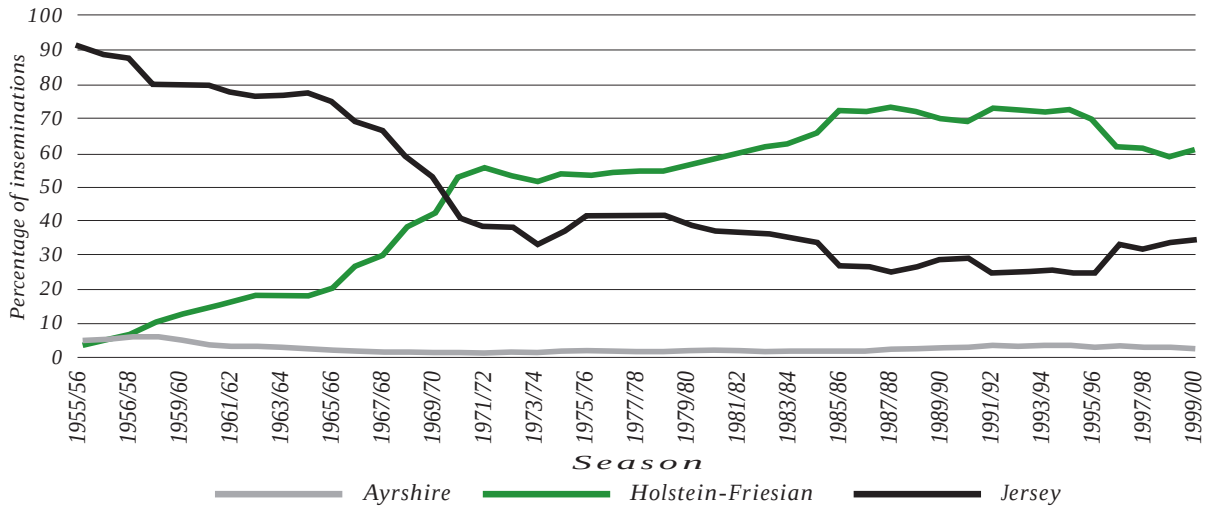


Graph 4.7: Holstein-Friesian semen usage by cow breed since 1995/96



The number of inseminations for each major breed (Holstein-Friesian, Jersey and Ayrshire) as recorded on the Livestock Improvement National Database is shown in Graph 4.8. The Holstein-Friesian and Jersey breeds increased slightly in use for the 1999/00 season.

Graph 4.8: Trend in the percentage of inseminations of each major breed since 1955/56



D. Animal Evaluation

The genetic merit of New Zealand dairy cows and sires is estimated using statistical methods which allow simultaneous evaluation of cows and sires of all breeds, using all recorded relationships. The structure of the national herd reveals large numbers of cross-bred cows, and large numbers of herds with mixed breeds. For this reason the national evaluation system is designed to compare animals irrespective of breed, both nationally and within herd, to allow farmers to select the most profitable animals for the future.

There are two types of evaluation calculated for New Zealand dairy animals:

1. Trait evaluations are a measure of an animal's genetic merit (*Breeding Values*), lifetime productive ability (*Production Values*) and current season productive ability (*Lactation Values*) for individual traits, including milkfat, protein, volume, liveweight, and longevity.
2. Economic evaluations combine an animal's individual trait evaluations to measure its ability to convert feed into profit, through breeding replacements (*Breeding Worth*), lifetime production (*Production Worth*) and current season production (*Lactation Worth*).

For each economic index, Economic Values are calculated for the relevant traits. For Breeding Worth, the Economic Values represent the net income per unit of feed from breeding replacements with a one unit genetic improvement in the trait. For Production Worth, the Economic Values represent the net income per unit of feed from milking cows with a one unit improved productive ability in the trait. In each case the base unit of feed is 4.5 tonnes of dry matter in average quality pasture.

The profit-related traits are combined into a single economic index. For example:

Breeding Worth	=	Milkfat BV	x	$EV	+
		Protein BV	x	$EV	+
		Milk BV	x	$EV	+
		Liveweight BV	x	$EV	+
		Longevity BV	x	$EV	

where : BV = Breeding Value for each trait

$EV = economic value for each trait for breeding replacements

Animal Evaluation ranks animals in terms of their expected profit per unit of feed eaten, ie it identifies those animals in a herd which are the most efficient converters of feed into profit. Breeding Worth (BW) and Production Worth (PW) are based on future price predictions for milk components, while Lactation Worth (LW) is based on predicted end of season prices.

The economic values for 1999/00 are presented below (Table 4.9). The economic values are reviewed annually and therefore may change from year to year.

Table 4.9: Economic values used from 26 February 2000

	Milkfat ($/kg)	*Protein ($/kg)*	*Milk ($/kg)*	*Liveweight ($/kg)*	*Longevity ($/day)*
Breeding Worth	1.18	3.50	–0.049	–0.49	0.029
Production Worth	1.52	4.07	–0.059	–0.60	–
Lactation Worth	1.97	4.80	–0.069	–0.73	–

The information for all Animal Evaluation statistics was sourced from cows recorded on the Livestock Improvement National Database at 12 May 2000, and from sires recorded on the Livestock Improvement National Database at 10 June 2000.

Table 4.10 shows the Breeding Values (BV) and BW by breed, of all bulls born in 1995, first proven in the 1999/00 season with a Reliability of 75% or greater.

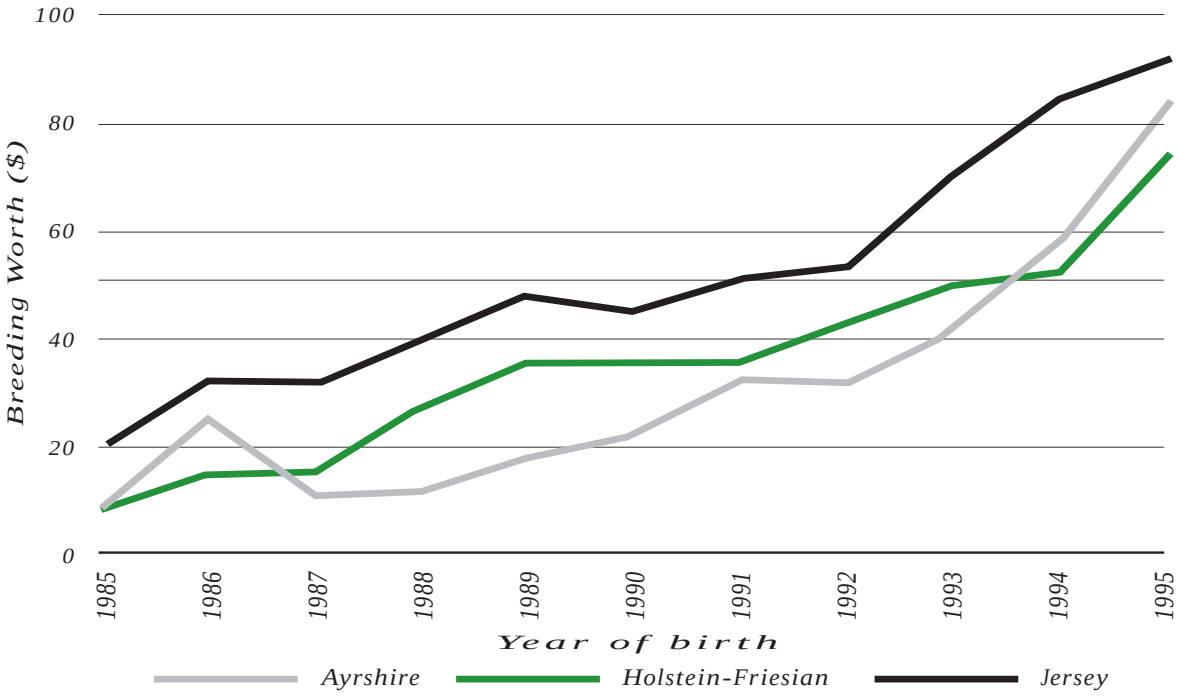
Table 4.10: Average Breeding Values (BV) and Breeding Worth (BW) of 1995 born bulls (reliability of 75% or greater)

Breed	*Milkfat BV*	*Protein BV*	*Milk Vol BV*	*Liveweight BV*	*Longevity BV*	*BW*	*Number of Sires*
Ayrshire	25.7	27.1	796	11.1	91.9	83.5	19
Holstein-Friesian	34.0	38.5	1272	78.7	–4.4	73.9	205
Jersey	21.7	14.0	137	–43.3	92.6	91.5	109

(Evaluation date 10 June 2000)

The genetic trend of proven dairy bulls is shown in Graph 4.9. Bulls born in 1995 are first proven in the 1999/00 season.

Graph 4.9: Genetic trend of proven dairy bulls by year of birth (reliability of 75% or greater)



(Evaluation date: 10 June 2000)

Young bulls are initially selected for use in Artificial Breeding (AB) based on the genetic merit of their sire and dam. These young sires are then progeny tested to estimate their true Breeding Worth via the production of their daughters. Each year some progeny tested bulls are returned to service for use as proven sires.

Table 4.11 shows the number of sires for which the Reliability of the BW was at least 75% – by birth year and breed. The information in this table is updated every year for all age groups to include older bulls that have now been proven in New Zealand.

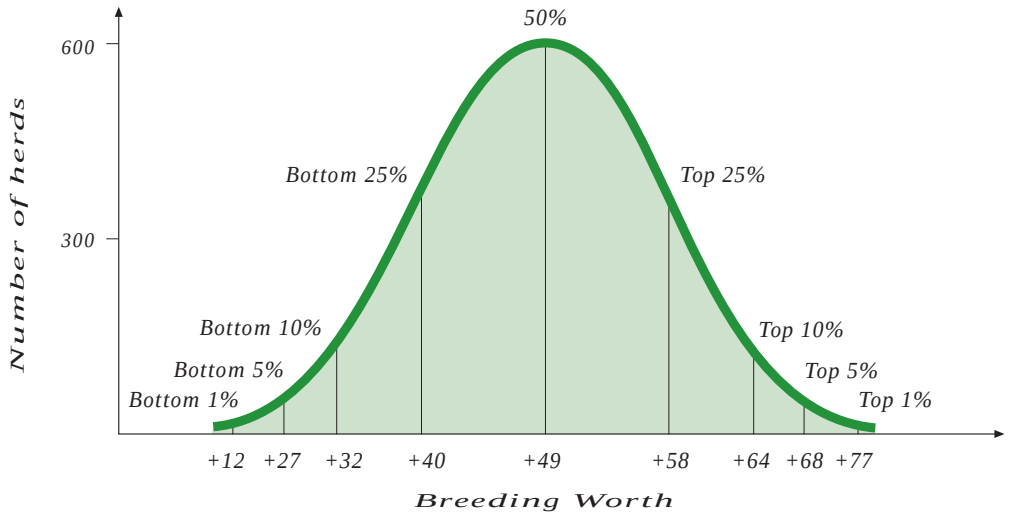
Table 4.11: Number of sires obtaining Breeding Worth (BW) by birth year and breed (reliability of 75% or greater, includes overseas bulls)

Year of birth	Number of sires	Holstein-Friesian	Jersey	Ayrshire	Other breeds
1985	313	184	93	22	14
1986	286	175	82	22	7
1987	318	193	94	18	13
1988	321	195	96	22	8
1989	364	212	116	20	16
1990	348	209	103	25	11
1991	358	228	97	25	8
1992	350	219	104	21	6
1993	330	198	105	23	4
1994	361	220	113	25	3
1995	336	205	109	19	3

(Evaluation date: 10 June 2000)

The distributions of BW and PW for herds presented below (Graphs 4.10, 4.11) are based on all cows recorded on the Livestock Improvement National Database with a test number in herds signed up for herd testing for the 1999/00 season. For example Graph 4.10 shows that 50% of New Zealand herds have a BW of 49 or above and that 25% of New Zealand herds have a BW of 58 or above.

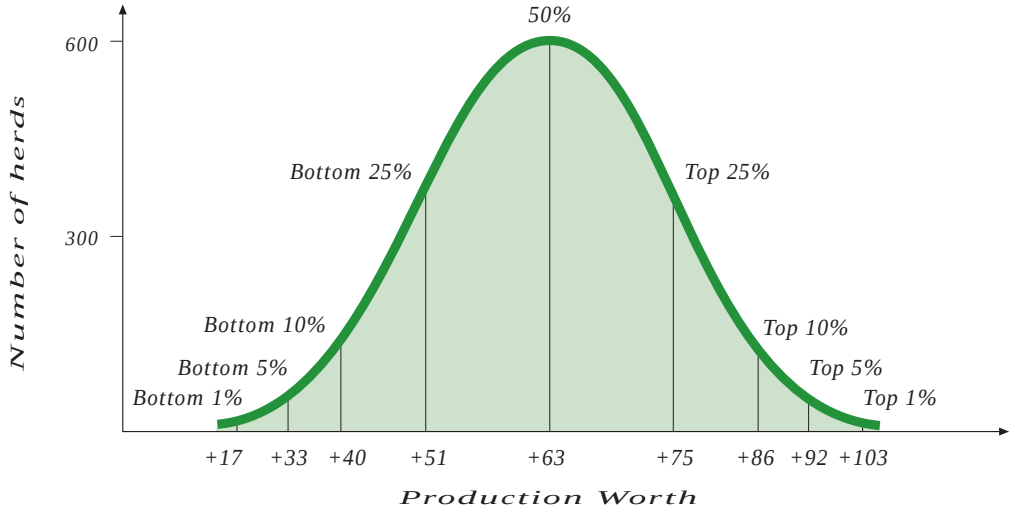
Graph 4.10: Distribution of herd Breeding Worth (BW) in 1999/00



(Evaluation date: 12 May 2000)

The distribution graph for PW for herds in the 1999/00 season is based on all cows recorded with a test number in herds signed up for herd testing for 1999/00. Graph 4.11 shows that 50% of New Zealand herds have a PW of 63 or above, and that 25% of New Zealand herds have a PW of 75 or above.

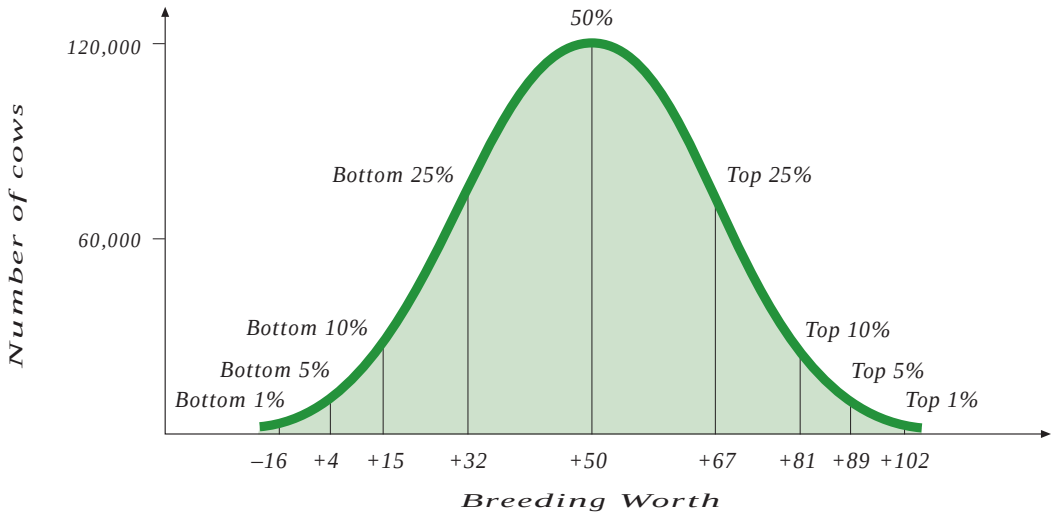
Graph 4.11: Distribution of herd Production Worth (PW) in 1999/00



(Evaluation date: 12 May 2000)

The distribution graphs for cows presented below (Graphs 4.12, 4.13) are based on all cows recorded on the Livestock Improvement National Database with a test number in herds signed up for herd testing for the 1999/00 season. Graph 4.12 shows that 50% of New Zealand cows have a BW of 50 or above and that 25% of New Zealand cows have a BW of 67 or above.

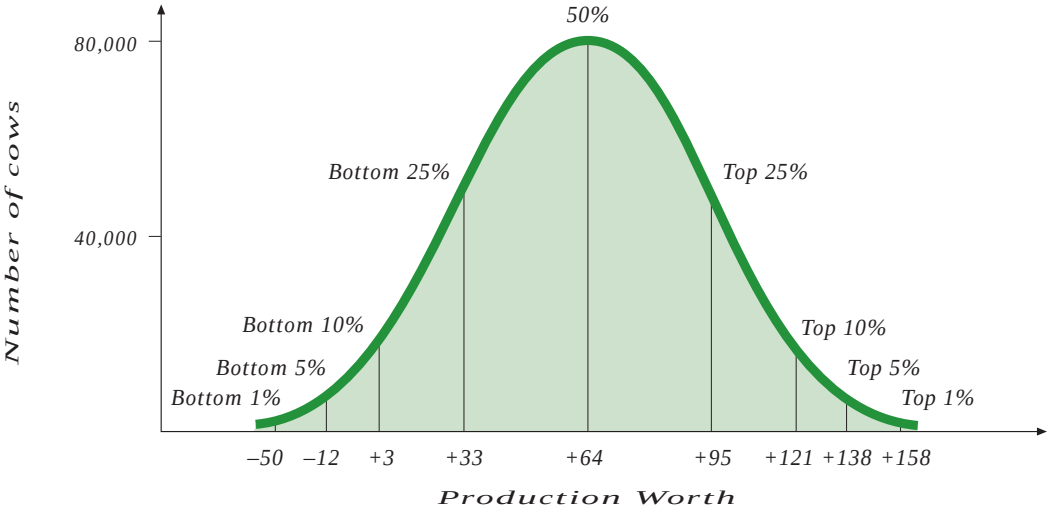
Graph 4.12: Distribution of cow Breeding Worth (BW) in 1999/00



(Evaluation date: 12 May 2000)

The distribution graph for cows presented below (Graph 4.13) is based on all cows recorded with a test number in herds signed up for herd testing for the 1999/00 season. Graph 4.13 shows that 50% of New Zealand cows have a PW of 64 or above and that 25% of New Zealand cows have a PW of 95 or above.

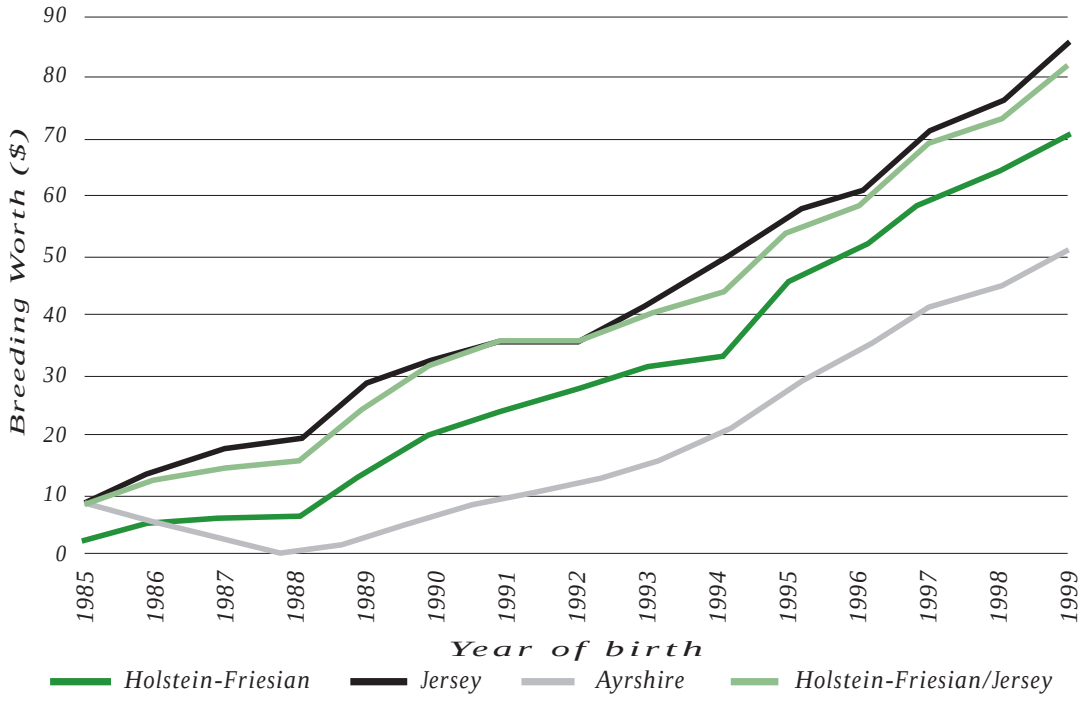
Graph 4.13: Distribution of cow Production Worth (PW) in 1999/00



(Evaluation date: 12 May 2000)

The genetic trend for cows is based on all cows recorded on the Livestock Improvement National Database in the 1999/00 season. Also included are the estimated BW and PW for replacement stock (1998 and 1999 born animals). All evaluations can be compared across breeds. The genetic trend for BW by breed is presented in Graph 4.14. The Breeding Worth for all breeds has increased over time.

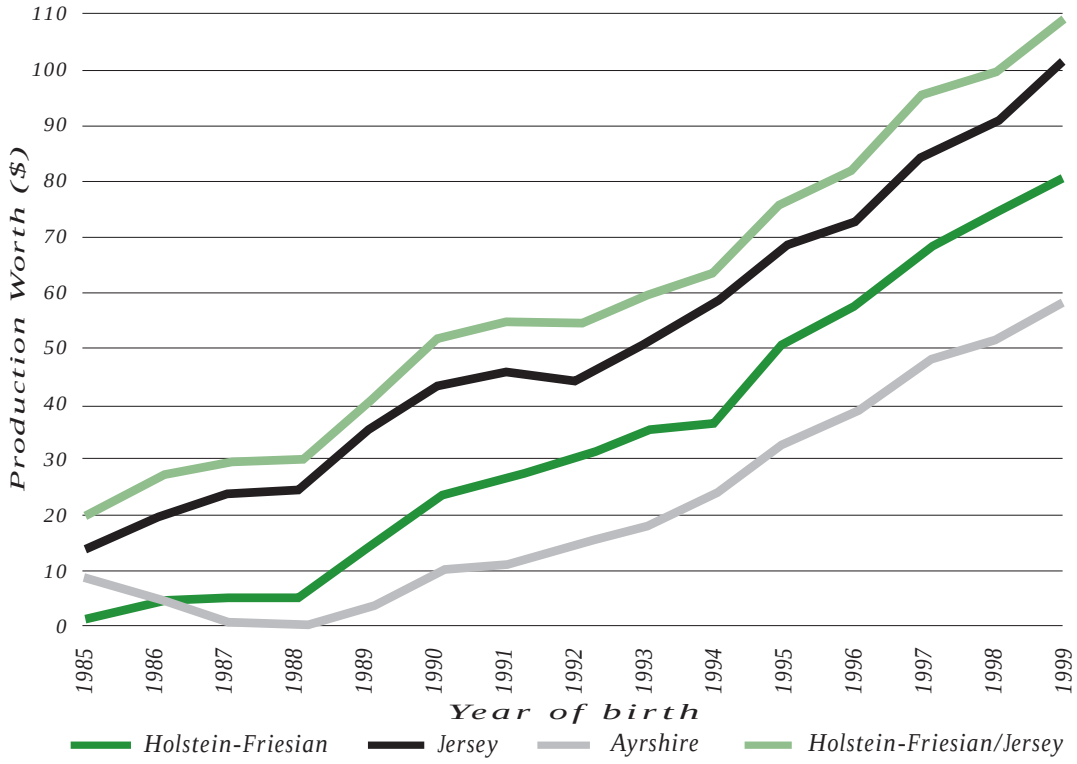
Graph 4.14: Genetic trend in Breeding Worth (BW) for all cows in 1999/00



(Evaluation date: 12 May 2000)

The trend for PW by breed is presented in Graph 4.15. Holstein-Friesian/Jersey cross-breds have maintained a higher PW over other breeds, caused by the effect of heterosis (hybrid vigour) in the cross-breds.

Graph 4.15: Trend in Production Worth (PW) for all cows in 1999/00



(Evaluation date: 12 May 2000)

Table 4.12 shows the average BVs and BW by breed, of all 1997 born cows. The Jersey breed has the highest BW at 70.8. The Holstein-Friesian cows have the highest milkfat, protein, and milk volume BVs. All evaluations are comparable across breeds.

Table 4.12: Average Breeding Worth (BW) and Breeding Values (BV) of all cows by breed born in 1997

Breed	BW $	Fat BV (kg)	Protein BV (kg)	Milk Vol BV (l)	Liveweight BV (kg)	Survival BV (%)	Cow numbers
Holstein-Friesian	59.1	26.95	26.51	833	54.6	73	425023
Jersey	70.8	16.96	6.67	–88	–43.7	64	125802
Ayrshire	41.3	11.08	15.51	488	6.9	46	10523
Holstein-Friesian/Jersey	68.9	23.49	17.15	375	5.7	85	195433
Guernsey	12.8	–2.21	1.52	29	18.2	–183	162
Milking Shorthorn	–5.1	–2.91	5.15	161	19.6	–77	1186
Brown Swiss	–24.4	–7.25	5.54	158	43.7	–215	171
Other	49.3	16.86	16.18	449	12.7	38	28215
Weighted Average	62.7	23.9	20.5	552	24.5	72.6	

(Evaluation date: 12 May 2000)

Survivability is measured by the percentage of cows that have a lactation recorded for consecutive years. The 1999/00 2-3 years figure is the percentage of cows that were milking as two-year-olds in the 1998/99 season and are now milking as three-year-olds in the 1999/00 season. Table 4.13 shows that for the 1999/00 season the highest percentage of survival is in animals ageing from 3-4 years.

Table 4.13: Survivability percentages since 1996/97

	Percentage (%) of age group surviving to next lactation						
Season	2-3 years	3-4 years	4-5 years	5-6 years	6-7 years	7-8 years	8-9 years
1996/97	84.9	85.1	84.8	81.6	78.2	74.2	69.0
1997/98	85.9	86.7	85.6	81.9	77.7	73.9	68.3
1998/99	84.5	86.1	85.8	83.0	80.0	75.5	70.5
1999/00	84.1	86.2	85.8	82.8	80.7	76.3	70.8

A refinement in the way survivability is calculated has resulted in minor adjustments to the percentages compared with previous seasons.